Consumer Federation of America

STATEMENT OF
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CONSUMER FEDERATION OF AMERICA,

On Behalf Of

THE CONSUMER FEDERATION OF AMERICA

and

CONSUMERS UNION

on

ENSURING THE RELIABILITY OF THE NATION'S ELECTRICITY SYSTEM

Before the

SUBCOMMITTEE ON ENERGY AND RESOURCES
COMMITTEE ON GOVERNMENT REFORM
U.S. HOUSE OF REPRESENTATIVE

June 8, 2005

Mr. Chairman and Members of the Committee,

My name is Dr. Mark Cooper. I am Director of Research at the Consumer Federation of America (CFA).[1] I also appear today on behalf of Consumers Union.[2] We have been deeply engaged in the debate over electricity restructuring and deregulation for almost two decades. I have submitted to you a list of appearances I have made before Congress and Federal Agencies, as well as state regulatory commissions, on this issue. I have also submitted the studies and analyses of the faltering efforts to deregulate electricity, which we have conducted since 1997, soon after the first radical restructuring laws were passed in a couple of states. Every six months for the last twenty years we have been cautioning policymakers not to experiment with electricity or treat it like any other commodity.

I greatly appreciate the opportunity to appear before you today to present the residential ratepayer view of the federal role in the ongoing troubles of deregulated electricity markets. It is about time that the voice of the little guy and gal, the people who pay the bill, is heard on this matter.

I also commend the Committee for focusing on the central purpose of the electricity network – to provide reliable power for a 21st century information economy – and for casting a broad net in its inquiry. Thus this hearing inquire into the purpose of "Ensuring the Reliability of the Nation's Electricity System." To conduct such an inquiry, as the Committee notes, one must "assess the status of the electricity system within the current regulatory environment, challenges to investment in transmission infrastructure and capacity, and how these issues must be addressed as part of a comprehensive energy policy."

In my remarks today, I will take just such a broad view, particularly in light of the fact that two-thirds of the states have figured out that deregulation is a road to ruin. They have had the good sense not to go down the road of electricity restructuring and deregulation or have decided to change course after being badly burned by deregulation and restructuring. It is time for federal authorities to change course too, or at least to pause for a substantial period while they rebuild the physical and institutional infrastructure of the electricity gird.

The Unique Nature of Electricity

Public Goods and Public Values: The reliability of the nation's electricity grid cannot be thrown to market forces. Reliability is a public good. The transmission system is a commons. The benefit of reliability is shared. Once you are hooked to the grid, it is hard to exclude anyone from enjoying the benefits of reliability. The benefit I get from reliability does not diminish the benefit my neighbor gets and all those who are hooked to the grid benefit together. Keeping the lights on has huge positive externalities and building these projects has large negative externalities. As long as policymakers try to commodify this infrastructure, they will restrict the supply of reliability and deny the public its full benefits.

For twenty years I have been delivering this message to policymakers,[3] backed up with detailed analysis of the travails of deregulation.[4] Last year, the Cato Institute saw the light and flip-flopped on the issue.

> In regulated markets, it is usually quite easy for economists to demonstrate that consumers do not benefit from regulation, but unlike many other markets, electricity markets have characteristics that are difficult to manage through property rights and contracts. Accordingly, regulation has at least the possibility of a plausible rationale.[5]

Public values deeply affect electric and telecommunications utilities, which are quintessential infrastructure industries. The public values involve the public good nature of infrastructure, the proper use of public resources, public participation and cooperation, as well as public responsibility and accountability of those providing the service. This industry is "affected by the public interest" and requires a proper balance between public obligations and private incentives. I believe that the genius of the American system in the 20th century was to find a way to impose social obligations without undermining the profit motive.

Capital-intensive assets in these industries are long-lived, sunk, and inflexible parts of an integrated network. Their value is to the network as a whole and not easily allocated. Long-term, public commitments are needed to support these infrastructure projects. Economics of scale and scope result in very small numbers of facilities and little head-to-head competition. The unique characteristics of electricity mean market forces will never be adequate to keep supply and demand in balance.

Demand: Electricity is a necessity that has no substitute on the demand side in the short-term. Electricity is like oxygen to the Twenty-First-Century economy and way of life. Denial of access to this service results in deprivation; access based only on price and the ability to pay results in discrimination.

Demand is highly sensitive to weather, which can create severe peaks in demand. Demand is not only driven by weather, it is also geographically focused. Typically, many consumers can be affected by the same factors that increase demand at the same time. This makes the demand on local and regional networks and commodity markets subject to extreme peaks and valleys.

Moreover, for the vast majority of consumers and over the relevant range of economic values, reliability is an externality. This is a network industry in which the fate of each depends upon the actions of all. Individuals cannot create their own reliability or capture its full value in private transactions.[6] Economic and institutional barriers make it difficult for small consumers to freely self-supply or to bargain effectively for supplies. Allocation of costs and benefits in this shared network is a difficult and ultimately arbitrary task.

In sum, the price elasticity of market demand is very low in the short-term and low in the long-term. The demand side cannot be counted on to discipline abusive pricing behavior.

Inflexibility of demand and its sensitivity to weather renders the market volatile and vulnerable to abuse.[7]

One of the key factors that drive prices up is the need of utilities to ensure the physical availability of supply. Imposing an obligation on utilities to serve creates an uneven bargaining context. Entities with the obligation to serve are at a disadvantage to those who simply produce or transport electricity. Consumers have generally supported this fundamental principle of utility service because electricity service is just too important to be unreliable.

The low elasticity of demand is now recognized as the most critical factor in rendering the market volatile and vulnerable to abuse. When demand is inelastic, consumers are vulnerable to price increases, because they cannot cut back or find substitutes for their use of the commodity. When the most important market force in disciplining market power, demand elasticity, is as low as observed for electricity, there are many opportunities to exercise market power.

Supply: Electrons are among the most demanding, ornery little beings in nature. They go where they want and if they arrive under the wrong circumstances, they can do serious harm. The physical system demands perfect balance on a real-time basis. Because of the basic physics of electricity, the production, transportation and distribution networks are extremely demanding, real-time systems. Electricity cannot be stored economically. The system requires perfect integrity and real-time balancing much more than other services and commodity systems do. The infrastructure to produce, transport, and deliver electricity is extremely capital-intensive and inflexible.[8] It takes a long time to build and bring power plants and transmission lines into service, and they last a long time. Thus, the ability to expand supply in the short and medium term is severely limited.[9] This is the critical factor that creates volatility and vulnerability to the abuse of market power on the supply side.[10]

Empirical studies show that strong economies are achieved by coordinating electricity supply and demand. Before restructuring, the electricity industry was a reasonably well-run, complex, integrated network that was under some stress.[11] Creation of markets for electricity services leads to a huge growth in the number of transactions conducted every day and creates heavy administrative requirements. An entity that once maintained real-time balance as an insulated operation that could oversee its own supply, demand, and delivery, must now contract to achieve real-time balance simultaneously in five, six, or seven different markets over broad geographic areas.[12] This has proven a daunting task[13] that consumes substantial resources.[14]

Accidents have a special role in market networks such as these. Because of the demanding physical nature of the network, accidents are prone to happen. Because of the volatile nature of the commodity, accidents tend to be severe. Because of the integrated nature of the network and demanding real-time performance, accidents are highly disruptive and difficult to fix. To keep things in balance, the system needs either plentiful reserves close at hand, ample amounts of transmission capacity readily available to move abundant supplies

from far away, or a great deal of load that can be quickly shed. Most electricity markets do not have those luxuries today,[15] or any chance of acquiring them any time soon.

The interstate highway system for the movement of electrons is inadequate and was not designed to handle market transactions. [16] Transmission capacity is constrained and extremely difficult to expand for environmental and social, not economic, reasons.[17] Getting approval to site new transmission lines is extremely difficult because of the negative impact on public spaces and concerns about public health. Similar constraints on the availability of distribution exist.[18] Wires are difficult to repair or replace in response to outages.[19] This places a premium on flexibility of supply and reserve margins, but neither of these is well-accommodated in the industry.[20]

In sum, the elasticity of supply is low. Short-term supply responses are constrained by the difficulty of storing electricity. Provision for reserve margins is uncertain in a competitive market because the provision of reserves is unattractive to business interests, unless peak prices are extremely high. Consequently, electricity markets free of reserve planning and coordination may be chronically tight or subject to extreme price instability.

Weak Market Forces Make for Bad Markets: The most important market forces are demand and supply elasticities—the ability of consumers to cut back or shift their demand for something and the ability of producers to increase their outputs in response to price increases. If these elasticities are too small, market forces are weak and the exercise of market power becomes more likely. Firms raise prices to increase their profits because they do not lose many sales to competitors, or because consumers lack alternatives. This is the reality of the electricity industry. As a result, deregulation or restructuring turns supply into a strategic variable.[21]

The inelasticity of supply gives rise to a second deviation from a typical competitive market, excessive scarcity rents. An economic rent is “a payment to a factor in excess of what is necessary to keep it at its present occupation.”[22] More importantly, “in perfect competition, no rents are made by any factor, because changes in supply bid prices of inputs and labor down to the level just necessary to keep them employed.”[23]

In economic theory, these sources of overcharges could be competed away if supply and demand elasticities are high and electricity markets worked well. In reality, because of the economic characteristics and social impacts of the electricity industry, supply and demand do not respond. The results are elevated prices and a transfer of wealth from consumers to producers that achieves little or no real costs savings or efficiency gains. Excessive scarcity rents accrue where changes in supply are slow or nonexistent,[24] exactly the circumstances that apply to electricity markets. The supply curve is so steep (supply is so inelastic) that the scarcity rents make up the vast majority of the market price, as demand moves toward the peak. Supply cannot respond to price signals, thus the owners of existing facilities just collect windfall profits.

Merchant Generators and Transmission Raising the Cost of Capital: The merchant generators and transmission owners claim that they must be compensated for the risk of development in an uncertain market, but that comes at the price of a much higher capital costs. Under market conditions there is no long-term security of demand, thus merchant generators demand higher rates of return and seek to recover their capital as quickly as possible. The result is to raise capital costs in the near term. A regulated utility approach to supplying electricity lowers the cost of capital. It lengthens the time horizon for investment, to match the lives of the assets. It brokers the relationship between the supply and demand sides to lower risk.

The implications of the increase in the cost of capital are striking. In analyzing "cost-plus" regulation for peaking facilities, the DOE (U.S. Department of Energy) focused its attention on a financial scenario in which merchant generators insisted on a 16 percent return on investment and a three-year cost recovery period (even though the facilities last twenty or thirty years).[25] In that analysis, a ten-year recovery results in a revenue requirement that is about half as large. The discussion shows clearly that very short cost recovery periods are driving industry behavior in critical areas, like bidding strategies and investment decisions.[26]

Regulated cost of capital results in lower costs for electricity.[27] Although the DOE analysis does not state enough of its assumption to consider the cost structure of a "utility" building peak plant, a financial analysis prepared by the California Energy Commission does.[28] Merchant finance raises the cost of capital by between 25 and 50 percent in these analyses. Merchant finance raises the costs of capital by almost 25 percent in the California Energy Commission view, because of a higher cost of equity. Shortening the cost recovery period, as the DOE does, drives capital costs up by another 20 percent. Reliance on more expensive equity (or more expensive debt) as is likely to be necessary for merchant plants, would drive the cost of capital even higher. Thus, the cost of capital for merchants is likely to be 50 percent higher than utility financed projects.

Contrary to the claims of some,[29] utility finance did not produce inadequate supply. In fact, if anything, the primary complaint against regulation was not that it resulted in too little capacity, but that it resulted in too much.[30] Regulators, who took the job of keeping the lights on very seriously, tended to authorize the building of too much capacity.[31] Primarily concerned with profit and not caring whether the lights go on, merchant generators are likely to build too little and charge much more for what they do build.

Striking the Right Balance Between Public Values and Private Incentives

Because public policy recognized that these industries are "affected with the public interest" almost from their inception a century ago, the United States developed a uniquely pragmatic approach that blended private and public interests. Unlike most other capitalist countries, where state monopolies provided these services, we relied primarily on private capital that was subject to direct oversight by state utility commissions. Utilities were granted franchises to serve in specific areas, which allowed them to finance projects with a low-cost,

long-term mix of debt and equity. In exchange, they shouldered public responsibilities like the obligation to serve all comers on demand, a commitment to “keep the lights on” or ensure the dial tone to a high level of reliability by building capacity, and a duty to interconnect on “just, reasonable and nondiscriminatory rates, terms and conditions.”

“Public ownership” was used to meet specific needs in parts of the country where private capital would not go and to provide a benchmark comparison between service areas. It was kept close to the people through municipal or direct consumer ownership, which prevented the growth of entrenched national bureaucracies. These segments of the industry, which avoided being swept up in the deregulation frenzy, have fared much better than the rest of the industry.

This pragmatic, diverse approach exhibited inefficiencies. Nevertheless, the balance between public and private was critical to ubiquitous, affordable, and reliable service. The result was the best utility sector in human history.

While economic theory could find ways to make these utilities better, economic reality proves the core characteristics are too powerful and important to fool with. Deregulation did just that, imposing market transactions and encouraging competition where vertical integration and cooperation are more efficient. The destabilizing effects of deregulation emerged first and worst in the competitive electricity and telecommunications sectors because these utilities require long-term perspectives and public obligations that are ill-suited for the “one size fits none” commodity market structure that policy makers imposed on them in the 1990s. Policy makers tried to force people to shop in the market for innovative utility products, when reliable, affordable service was all they wanted and really needed. “Deintegration” quickly turned into disintegration because capital and commodity markets would not support the public functions served by these industries.

Deregulation undermined the long-term perspective needed for funding and stability of utilities, resulting in a dramatic increase in the cost of capital. Both electricity and telecommunications are “wires” industries, dependent on public rights of way and use of common resources (air, water, and airwaves). Deregulation underestimated the need for management of these public assets and bottleneck facilities. Deregulation let the lights go out and removed the obligations to provide just, reasonable, and nondiscriminatory access to vital networks, imposing substantial disruption costs on the public. Deregulation short-circuited the cooperation (seamless interconnection and smooth operation) necessary to run highly complex, integrated networks, thus raising transaction costs. Deregulation has not produced transparent, dependable sources of information, making it difficult to gather and share information on network operations and conditions, making management arduous and less efficient. In short, deregulation increased costs by raising the cost of capital, creating excessive scarcity rents, increasing transaction costs, and increasing reserve requirements.

Even the Cato Institute Finally Understands Electricity: Cato has discovered that the grid is a public good. In economic jargon, it provides the stage for a comedy of the commons. For example, the alternating current (AC) grid is a "commons." [32]

> Power added by any generator on an AC transmission system follows all paths but favors those with least resistance rather than the shortest distance between generator and customer. Thus, bilateral contracts between any willing seller and buyer of electricity affect all other buyers and sellers within each interconnected system in ways that are not captured by prices—the textbook definition of externality (6).
>
> Moreover, transmission additions confer benefits across all generators and consumers on the grid and thus have public good characteristics. The development of property rights and prices that internalize those characteristics is very difficult. (6)

Demand elasticity is extremely low.

> Market forces, it was hoped, would introduce marginal-cost pricing and as a result reduce peak demand, increase off-peak demand, and reduce the needless political fighting (most notably, the eternal fight over more supply versus less demand) that inevitably arises in electricity markets because of the absence of prices as a signaling device. (3).
>
> Prices in San Diego were free of all control from July 1999 though August 2000: a doubling of prices resulted in a demand reduction of 2.3 percent, an extremely disappointing response.
>
> Even though demand does respond to price, many observers have concluded that demand responsiveness is too low, and, therefore, price spikes would be too high for too long in a truly deregulated environment with tight supplies.

Cato has discovered the problem that utility assets create because of their long-term fixed nature. The problem that results is one that frequently afflicts common pool resources, a tragedy of the anti-commons:

> [I]n an unregulated world, the relations between electric firms and consumers would likely be governed by long-term contracts because the dedicated nature of electricity assets implies that each side can "hold up" the other.
>
> In short, the weakness of the private solution is the inability of investors to capture the full benefits of their investment. (7)

Administrative challenges strain the grid:

> Although the blackout was not caused by market forces, it is likely that the increased loads and flows across a transmission grid that has experienced little new investment is causing greater stress upon the hardware, software, and human beings that are critical components of the system. (4)

Supply-side scarcity rents are extreme in this industry:

> In unregulated electricity markets, then, marginal sources of electricity – such as high cost generators typically in operation only during the peak-demand periods – would need to earn at least a normal return. That implies that those facilities with lower marginal costs whose supply is limited… would receive payments in excess of marginal cost (and a normal return) in an unregulated market. (5)
>
> If we are correct, this implies that gains to trade not occurring under the current balkanized system are much smaller than many observers believe. Accordingly, the fight between the old regime and a restructured regime (that is, the case for a transmission-intense versus balkanized system) is a fight about wealth rather than efficiency. (6)

The authors also discover political economy.

> This is why low-cost states vigorously resist a national integrated electricity market – it would allow their electricity to go to the highest bidder rather than to those who happen to reside within an electric utility's current service territory.
>
> State decision makers understandably resist using ratepayer dollars to pay for investments that will primarily help parties outside the state. (4)

DEREGULATION INCREASES THE DEMANDS ON THE TRANSMISSION NETWORK AND DECREASES THE CAPACITY OF THE GRID

Given the characteristics of electricity, we have long doubted the benefits of deregulation; these doubts apply with special force to transmission. Investment in these facilities is constrained by social concerns. There is no prospect of competition in transmission and the physics of electron flows leave little room for market transactions to improve on engineering decisions. That is why two major government studies in the past couple of years and one by the South Eastern Regulatory Utility Conference[33] have all reached the same conclusion: there are few efficiency gains to be made by creating regional transmission organizations.

Moreover, this analysis can be used to pinpoint numerous economic and operational mechanisms through which electricity restructuring and deregulation increased pressures on the nation's electricity transmission network:

- A dramatic increase in the number and complexity of transactions, which the system was not designed to support.
- Difficulties of coordination and planning as competition and contracts replace vertically integrated operational and administrative decisions.
- Disincentives to invest in transmission because the private interests of facility owners conflict with the shared, public nature of the transmission grid and to

spend on maintenance because of profit pressures and the perceived competitive disadvantage associated with spending on a system shared with potential competitors.

- Increasing needs for excess capacity to cope with the market manipulation problems that plague electricity markets and to dampen price spikes that result from trying to treat electricity like a commodity.
- Failure to account for the social and environmental constraints on increasing transmission capacity and provide a framework for comprehensive planning that integrates alternative approaches, like energy efficiency and local (distributed) generation (such as co-generation, etc.)
- Deregulation certainly does contribute to stress on the system, making accidents more likely, more severe and more difficult to respond to.

Increasing the Number of Transactions: Creation of markets for electricity services leads to a huge growth in the number of transactions conducted every day and creates heavy administrative requirements.[34] Over the past decade, the number of traders increased over 50-fold; the quantity of electricity traded increased several hundred times.[35] There were also complications of financial and ownership relationships between entities which made managing those transactions a difficult and costly task.[36] A system operator requires significant resources raising the total cost of operating the system, as those costs are included in the cost of each transaction. The complexity of scheduling power delivery for multiple generators and retailers also adds costs to the system.[37]

In addition to the administrative transaction costs and managerial functions are facilities' costs. Demands on network facilities increase as a result of the wide range of transactions taking place. An increase in the number of transactions requires costly improvements to the transmission system in order to ensure reliability.

Reliance on financial relationships, rather than physical relationships, adds another problem.[38] Market participants have discovered that they cannot count on firm financial transactions and that they are subject to what they perceive to be arbitrary declarations of emergencies or contractually correct, but extremely disconcerting actions by merchants and utilities.[39]

Increasing Difficulty Of Coordination: The critical coordination and integration functions performed by vertically integrated, non-competitive firms that are essential to the operation of the electricity grid become more difficult as utility service is de-integrated and competitive transactions expand.[40] These functions are further undermined by breaking the industry into competing component parts.

One of the central activities of electric utility monopolies is to balance load — to aggregate customers who use electricity at different times of the day or year. By bringing together customers with dissimilar load patterns, utilities are able to use their facilities more

fully — to balance periods when some customers are off line with other customers who are on line. Market participants do not have an incentive to cooperate. Under deregulation, sellers and buyers seek the best deal for themselves and will not necessarily consider the needs of balancing and coordination.[41] They may withhold capacity and misreport information.[42] The failure of the Federal Energy Regulatory Commission to investigate the price spikes of 1998,[43] its belated recognition of the massive abuses in California,[44] and its inability to come to grips with the problem,[45] not to mention the ongoing scandal in natural gas pricing, demonstrate the folly of relying on after-the-fact investigations of abusive market transactions.[46]

Moreover, the rules for allocating scarce transmission resources during times of stress have not been worked out. In a competitive market, some entities gain by hoarding transmission capacity—in other words, reserving more transmission capacity than is actually needed to move that firm's power to end use customers. As a result, transmission markets may appear more constrained to buyers than they are in real physical terms.[47] This type of market-driven behavior, interacting with real, physical transmission constraints, makes it difficult to determine the true physical condition of the transmission system.

Thus, we have a new market in which a multitude of complex transactions are being made. One of the most important requirements for coping with this new market situation would be good information. Unfortunately, such information is not available. There is simply no centralized, reliable source of information. Information is much more difficult to gather for system aggregators.[48] What is more, the information available may be unreliable. Brokers and facility owners, who seek to maximize profits and are the sources of information, may well have interests that would be served by skewing information in one direction or another.[49] After a decade of deregulation, the Federal Energy Regulatory Commission has yet to create an information system for assessing the status of the grid or even the actual price of electricity and natural gas being sold in the market.

Disincentives to Invest: Policymakers compounded all of the problems by rushing ahead with deregulation where transmission facilities were inadequate and not designed to support the transactions that policy makers were stimulating. The problem of inadequate capacity was immediately reflected in both the inability to move power between regions of the country and the existence of load pockets within regions.[50] The inadequacy of transmission is pervasive and widespread; policymakers were irresponsible to push deregulation ahead without first ensuring there was adequate capacity.

It is true that the problem became worse during the transition to deregulated markets as a number of factors interacted to create a disincentive to expand and maintain transmission assets.[51] Incumbent utilities, which were being stripped of their franchise territories, were reluctant to invest in transmission facilities while the rules were uncertain, but this is not simply a transitional issue. Since expanding transmission capacity would facilitate competition with electric utility merchants' own generation assets, it is not in their best, private interest, to do so. Merchants in the electric utility industry do not have an interest in building excess capacity and they bear none of the disruption costs if supply is interrupted.

Worse still, markets are sufficiently concentrated that gaming repeated auctions is a chronic problem.[52] They make more when markets are tight and they have certainly shown in California that they do not care if the lights go out.

Inadequate Incentive to Maintain Facilities: Facing greater pressure on their earnings, an easy way for formerly regulated entities to maintain profits was to cut back on maintenance. The tendency to scrimp on maintenance is not solely a function of the transition, however. Whenever competition is introduced into utility industries, a lowest common denominator mentality takes over. Investments in public obligations, like system-wide maintenance, are seen as imposing a competitive disadvantage so such activities go begging.[53]

In theory, in a competitive market, poor service would induce customers to switch to different suppliers. In practice, there has been little switching in electricity generation markets, where competition was supposed to be the most intense. It is very unlikely that there will ever be competition in the transmission and distribution facilities over which competitively generated electricity was supposed to flow. The notion that multiple sets of electricity wires will compete for customers or business is fanciful at best. The burden of inadequate service and poor quality falls on the public, which as consumers, has no choice.

Increasing Needs for Increasingly Expensive Excess Capacity: Reserve margins and excess capacity emerge as critically important factors for maintaining system reliability and for disciplining market power. In a restructured industry, keeping the lights on involves two problems, not one. Not only must the electrons be available, but the consumer must also be able to afford to flip the switch.

Provision for reserve margins is uncertain in a competitive market because the cost of provision of reserves is unattractive to business interests, unless peak prices are extremely high. Merchant generators also demand higher rates of return and shorter payback periods, further increasing costs.[54] Consequently, electricity markets free of reserve planning and coordination may be chronically tight or subject to extreme price instability.

Based on restructured market performance, reserve margins need to be well above traditional levels of 15 to 20 percent and perhaps as much as 30 percent to prevent the abuse of market power.[55] In addition to the normal operating reserve that the industry has required, there must also be a competitive, or economic, reserve whose primary function is to restrain pricing abuse and instability.

Social and Environmental Constraints on Transmission Capacity: The fundamental problem with transmission is not inadequate economic incentives to invest;[56] the primary problem is resistance to the building of additional transmission lines for environmental, health and safety reasons. The social cost of transmission facilities is far greater than their economic costs. For this reason, scarcity of transmission in the economic sense is likely to be a permanent part of the industry landscape.

Moreover, the benefits of these shared transmission facilities that support the overall network are difficult to align with costs. The problem is both geographic, determining which benefits accrue to which areas, and intergenerational, recognizing that different parts of the system may benefit differently from the same investment across time. Today's investment to serve a long distance transaction may be a core part of tomorrow's system serving native (local) load. The shared nature of the facilities makes it more difficult for private investors to recover their costs and to overcome the social resistance to the siting of facilities. The shared nature of the facilities across jurisdictions makes it more difficult to reconcile competing interests.

Such public investment is best carried out within the framework of a comprehensive plan. Yet, integrated resource planning is harder to implement in the deregulated model, if it is not abandoned altogether.

Conclusion and Recommendations

The New Deal laws that governed electricity and telecommunications for 60 years (the Public Utility Holding Company Act (PUHCA) and the Federal Power Act) were heavily criticized as out-dated in the 1980s and 1990s. Recent events make these laws look far more reasonable.

PUHCA was designed to simplify ownership structure of electric utilities. Properly implemented, PUHCA would require simplified structures, examine accounting practices, review affiliate transactions, and restrict diversification by requiring direct functional relationships between activities.

The Federal Power Act enshrined the concept of just and reasonable rates based on cost, rejecting the concept of allowing monopolies to charge whatever the market would bear in the hope of inducing competition. It strove for universal service and focused incentives within strictly defined lines of business, providing more than adequate returns to induce investment in the provision of these basic necessities. It suppressed abuse and created a stable investment environment.

Misled by the effectiveness of this legislation, deregulation undervalued consumer and investor protections as well as the importance of smoothing out boom and bust cycles. Deregulators assumed that the correlation between the sharp increase in public interest obligations codified by the New Deal legislation and the subsequent growth in these industries was just a coincidence. However, there is growing evidence that they were wrong.

The success of electrification and deployment of telecommunications was largely accomplished in the half century after New Deal legislation established a national commitment to universal service in these industries. The evidence does not stop there. Take a look at the analysis published by the Cato Institute under the title *The Greatest Century that Ever Was: 25 Miraculous Trends of the Past 100 Years*.[57] If one looks closely at the figures, the title should have been *The Greatest Half-Century That Ever Was: How the 50 Years after*

the New Deal Transformed America. If one looks at improvements in public health, education, wealth, and welfare, it was the half-century after the New Deal that made the 20th Century the American Century.

For the past decade, policy makers and regulators in Washington, D.C., and the Northeast have spent a lot of time trying to make the new electricity markets work. At the same time, they have neglected to upgrade and maintain a reliable electricity transport system. Congress and the FERC should devote all of their energy to studying, strengthening and managing the interstate transmission system – to promoting the public interest, not the profits of merchant generators and transmission owners.

During the 1990s, stodgy "old economy" utilities, with their slow growing but secure, dividend-paying stocks, were reviled on Wall Street in comparison to the "sexy" paper returns of the dot-coms. Utility stocks reflected the economic environment that public policy had created for them, one founded on the principle that the infrastructure building blocks for the rest of the economy need stability and long-term commitments. Now that the bubble has burst, investors will flock back to a dull sector that offers a solid and stable total return provided that public policy rediscovers the principle that electricity and telecommunications are deeply "affected with the public interest" and restores the balance between private incentives and public interest in these industries. This analysis suggests that we need an explicit reorientation to public values, not a tweaking of rules governing private behavior in these sectors.

The failure to recognize the important role of the continuing monopoly in transmission resulted in the under-regulation of the wires segments of the industry. This is a highway system, not a market. It constitutes an essential, bottleneck facility with virtually no redundancy and is never likely to support head-to-head competition. Proposals to let the marketplace solve the wires problem will not succeed, given the market power that the wire "owner" would possess and the non-market barriers to expanding capacity. Profit maximization on the transmission system would only result in the abuse of market power and the creation of artificial scarcity rents. "Getting the prices right" from a monopolist's point of view for a bottleneck resource like transmission in a critical infrastructure network industry like electricity is not the answer to the problem of maximizing societal welfare.

Congress and FERC are headed in the wrong direction. Consumer Federation of America and Consumers Union recommend:

- Congress should not repeal the Public Utility Holding Company Act.
- Congress should pare back the Electricity Title of the Energy Bill to a reliability-only title. Both the physical and institutional infrastructure of the industry needs careful study and consideration.
- Congress should require a comprehensive survey of the national grid, since such a survey has not been conducted in forty years. It should identify the upgrades that are necessary for reliability and those whose primary purpose is to expand transactions.

- Congress should study the question of how best to establish standards and regulatory oversight over privately owned transmission lines. Voluntary self-regulation has been uneven and inadequate. Mandatory self-regulation is little better. More public oversight is necessary.
- Congress should examine new institutions that can reconcile the interests of the states and include representation of consumer interests. FERC's proposal for regional, quasi-voluntary institutions of nebulous authority and ill-defined rights and responsibilities is not a solution.
- Congress should require a framework for comprehensive planning that considers all alternatives. It should get serious about energy efficiency. It could also give a boost to local (distributed) generation, which has the double benefit of adding generation resources to the system while not using the long distance transmission lines, whose failure triggered the recent black out.
- FERC should abandon its Standard Market Design.

I appreciate the opportunity to appear today and look forward to working with the Congress to fashion an electricity policy the serves the public interest.

ENDNOTES

[1] CFA is the nation's largest consumer advocacy group, a non-profit association of 300 pro-consumer groups, with a combined membership of 50 million, founded in 1968 to advance the consumer interest through advocacy and education.

[2] Consumers Union is a nonprofit membership organization chartered in 1936 under the laws of the State of New York to provide consumers with information, education and counsel about goods, services, health, and personal finance; and to initiate and cooperate with individual and group efforts to maintain and enhance the quality of life for consumers. Consumers Union's income is solely derived from the sale of *Consumer Reports*, its other publications and from noncommercial contributions, grants and fees. In addition to reports on Consumers Union's own product testing, *Consumer Reports*, with approximately 4.5 million paid subscribers, regularly carries articles on health, product safety, marketplace economics and legislative, judicial and regulatory actions which affect consumer welfare. Consumers Union's publications carry no advertising and receive no commercial support.

[3] Cooper, Mark, Industrial Organization and Market Performance in the Transportation and Communications Industries: A Review of Current Theories and Empirical Applications to the Railroad, Electric Utility, Airline, Telecommunications and Oil Pipeline Industries with Hypotheses about Natural Gas Pipelines (Washington: Consumer Federation of America, January 1986); "Theory vs. Reality," paper presented at the Consumer Federation of America Utilities Conference, Washington, April 6, 1987); "Protecting the Public Interest in the Transition to Competition in New York Industries," The Electric Utility Industry in Transition (New York: Public Utilities Reports, Inc. & the New York State Energy Research and Development Authority, 1994); Residential Consumer Economics of Electric Utility Restructuring (Washington: Consumer Federation of America and Consumers Union, July 1998)

[4] Cooper, Mark, *Electricity Restructuring and the Price Spikes of 1998* (Washington: Consumer Federation of America and Consumers Union, 1999), *Behind The Headlines Of Electricity Restructuring* (Washington: Consumer Federation of America, 2000, *Reconsidering Electricity Restructuring* (Washington: Consumer Federation and Consumers Union, 2000), "Back To Basics In Analyzing The Failure Of Electricity Restructuring: Accepting The Limits Of Markets," paper presented at Energy Markets in Turmoil, Institute for Regulatory Policy Studies Illinois State University, Normal, Ill., May 17, 2001, *Electricity Deregulation And Consumers: Lessons From A Hot Spring And A Cool Summer* (Washington: Consumer Federation of America, 2001); *All Pain, No Gain: Restructuring and Deregulation in the Interstate Electricity Market* (Consumer Federation of America, September 2002), "An Economic Explanation of Why the West and South Want to Avoid Being Infected by FERC's SMD and Why Market Monitoring is Not an Effective Cure for the Disease," *SMD Market Metrics Conference*, Federal Energy Regulatory Commission, October 2, 2002, "Economics of Power: Heading for the Exits, Deregulated Electricity Markets Not Working Well," *Natural Gas*, 19:5, December 2002, *How Electricity Deregulation Puts Pressure On The Transmission Network And Increases It's Cost* (Consumer Federation of America, Consumers Union and U.S. PIRG, August 2003), "Recognizing the Limits of Markets, Rediscovering Public Interest in Utilities," in Robert E. Willett (ed), *Electric and Natural Gas Business: Understanding It! (2003 and Beyond)* (Houston: Financial Communications: 2003).

[5] Taylor, Jerry, and Van Doren, Peter. (2004). *Rethinking Electricity Restructuring.* Washington: Cato Institute, p. 6.

[6] It has now become apparent that the value of peak load reduction is far higher than the market clearing price at the peak. Marcus, William B., and Greg Russzon, *Cost Curve Analysis of the California Power Markets*, (Sacramento: JBS Energy, Inc., 2000), estimates the value of peak shaving at between 5 and 10 times the market clearing price. Borenstein, Severin, *The Trouble With Electricity Markets* (University of California Energy Institute, Program on Workable Energy Regulation, January 2001) (hereafter, Borenstein, *Trouble)*, uses an example in which the value of reduced demand is just under four times the market price. He argues that the ISO should capture this externality. The point is that it is highly unlikely that this externality will be internalized in direct, bilateral market transactions.

[7] Phillipovic, Dragana, *Energy Risk: Valuing and Managing Energy Derivates* (New York: McGraw-Hill, 1998), p. 3, cites a number of factors that distinguish energy from other commodities, but makes it quite evident that the need to physically consume the product on a real-time basis is the central factor.

[8] Gegaux, Douglas and Kenneth Nowotny, "Competition and the Electric Utility Industry," *Yale Journal on Regulation*, 10 no. 63, 1997; Gilsdorf, Keith, "Testing for Subadditivity of Vertically-Integrated Electric Utilities," *Southern Economic Journal*, 18 no. 12 (1995): Henderson, J. Stephen, "Cost Estimation for Vertically Integrated Firms: the Cost of Electricity," in M. A. Crew (Ed.), *Analyzing the Impact of Regulatory Change in Public Utilities* (Lexington, Mass., Lexington Books, 1985); Hirst, Erick and Brenda Kirby, "Dynamic Scheduling: The Forgotten Issue," *Public Utilities Fortnightly*, April 15, 1997; Kaserman, David L. and John W. Mayo, "The Measurement of Vertical Economies and the Efficient Structure of the Electric Utility Industry," *Journal of Industrial Economics*, 29 no. 5 (1991); Kwoka, John E. Jr., *Power Structure: Ownership, Integration, and Competition in the U.S. Electricity Industry* (Dordrecht, Boston:

1996); Roberts, Mark J., "Economies of Density and Size in the Production and Delivery of Electric Power," *Land Economics*, 62 no. 4 (1986).

[9] Hirst, Eric and Stand Hadley, "Generation Adequacy: Who Decides," *Electricity Journal* (October 1999) and Borenstein, *Trouble*, argue for market-based solutions to ensure capacity sufficiency on the basis of demand side responsiveness, not supply-side construction of reserves.

[10] Pirrong, Stephen Craig, *The Economics, Law and Public Policy of Market Power Manipulation* (Boston: Kluwer, 1996), pp. 10, 24, 59, 70, identifies storage and transportation costs, as well as low elasticities of demand as critical factors making market manipulation more likely.

[11] Mistr, Alfred E. Jr., "Incremental-Cost Pricing: What Efficiency Requires," *Public Utilities Fortnightly*, January 1, 1996; Oren, Samuel S., "Economic Inefficiency of Passive Transmission Rights in Congested Electricity Systems with Competitive Generation," *The Energy Journal*, 18 no. 1 (1997), "Passive Transmission Rights Will Not Do the Job," *The Electricity Journal*, 10 no. 5 (1997); Ostroski, Gerald B., "Embedded-Cost Pricing: What Fairness Demands," *Public Utilities Fortnightly*, January 1, 1996; Radford, Bruce W., "Electric Transmission: An Overview, *Public Utilities Fortnightly*, January 1, 1996; Volpe, Mark J., "Let's Not Socialize Transmission Rates," *Public Utility Fortnightly*, February 15, 1997; Bohi, Douglas and Karen Palmer, "The Efficiency of Wholesale vs. Retail Competition in Electricity, *The Electricity Journal*, October 1996; Cornelli, Steve, "Will Customer Choice Always Lower Costs?" *The Electricity Journal*, October, 1996.

[12]Geographic scope is needed to achieve what network economists call "pool effects" in network industries. Stabell, Charles B. and Oysteing D. Fjeldstad, "Configuring Value Chains for Competitive Advantage: On Chains, Shops and Networks," *Strategic Management Journal*, 19 (1998); or load balancing in the electric utility industry, Cooper, *Residential Consumer Economics.*

[13] Earle, Robert L, Phillip Q. Hanser, Weldon C. Johnson, and James D. Reitzes, "Lessons from the First Year of Competition in the California Electricity Market," *The Electricity Journal* (October 1999), describe the process in a context that finds the potential for market power and inefficiency.

[14] FERC, Staff Report to the Federal Energy Regulatory Commission on the Causes of the Pricing Abnormalities in the Midwest during June 1998 (Washington, D.C., 1998) (hereafter, FERC, Staff Report), p. 3-2; Public Utilities Commission of Ohio, Report; Kiah, E., *Thoughts on Wild Prices*, July 1998; Department of Energy, *Interim Report of the U.S. Department of Energy's Power Outage Supply Study Team*, (Washington, January 1999) (hereafter DOE, Outages).

[15] Cambridge Energy Research Associates (CERA), *Electric Power Trends: 2001* (Cambridge, Mass.: 2000); *High Tension: The Future of Power Transmission in North America* (Cambridge, Mass.: August 2000) (hereafter, CERA, *High Tension);* Stipp, David, "The Real Threat to America's Power," *Fortune*, March 5, 2001.

[16]CERA, *High Tension.*

[17] Brendan, Kirby and Eric Hirst, "Maintaining Transmission Adequacy in the Future," *Electricity Journal* (1999), acknowledge the primary importance of noneconomic factors.

[18] DOE, *Outages*, Finding, 30.

[19] Ibid., 9, 31.

[20] Ibid., 1, 16.

[21] Even introductory economics texts now contain long discussions of strategic behavior and game theory [see, for example, Taylor, *Economics*, Chapter 11] and it has become a routine part of applied policy analysis [Hasting, Justine, "Factors that Affect Prices of Refined Petroleum Products" (Washington, D.C. Federal Trade Commission Public Conference, August 2, 2001)].

[22] Pearce, George, *The Dictionary of Modern Economics* (Cambridge, Mass.: MIT Press, 1984), p. 124.

[23] Bannock, Graham, R.E. Banock and Evan Davis, *Dictionary of Economics* (London: Penguin, 1987), p. 128.

[24] The origin of the concept has been associated with land, hence it is occasionally referred to as ground rents (Rutherford, Donald, *Dictionary of Economics* (London: Routledge, 1992), p. 137).

> As land was regarded in **classic economics** as the only fixed factor of production, it alone earned rent. However, as any factor of production can be fixed in supply, "rent" can be earned by any factor of production. Popular examples of factors with an **inelasticity of supply** abound; labor can earn economic rent as persons with rare talents (e.g. opera singers and top sports players) have high earnings largely consisting of economic rent.

Teece, David, J. and Mary Coleman, "The Meaning of Monopoly: Antitrust Analysis in High-Technology Industries," *The Antitrust Bulletin* (Winter 1998), p. 819, define scarcity rents as:

> In many contexts where knowledge and other assets underpin a firm's competitive advantage, additional inputs cannot simply be purchased on the market to expand output… historically at least, economists have associated Ricardian rents with scarce natural resources like land or iron ore.

[25]U.S. DOE, Office of Economic, Electricity an Natural Gas Analysis, *The Impact of Wholesale Electricity Price Controls on California Summer Reliability* (Washington, June 2001).

[26] Ibid., *p. 13.*

> Thus, a new combustion turbine would have to operate for more than 55 percent of the hours in a year in order to recover its fixed costs over a 3-year period if it were paid only $25/megawatt hour above its operating costs…
>
> Because combustion turbines have high operating costs and are built to meet peak demand, developers generally expect that they will have relatively low capacity factors, ranging from 10 percent to 30 percent, significantly less than would be required to recover capital costs in 3 years under the cost-plus proposal. Although capacity factors for new combustion turbines in California are likely to be above average for the next year, the projected break-even point of more than 55 percent represents a considerable risk for developers, which many will be unwilling to bear. Even if a developer expected to spread the plant's fixed costs over a 10-year period, the risk would still be high at a projected capacity factor of nearly 30 percent every year for 10 years.

[27]Watts, Price C., "Heresy? The Case Against Deregulation of Electricity Generation," *The Electricity Journal*, 2001 (March 3).

[28] Staff Report, *Market Clearing Prices Under Alternative Resource Scenarios: 2000–2010* (Sacramento: California Energy Commission, February 2000). The alternative analyses focus on a combined-cycle plant, but the only difference in the financial assumptions is to increase the fixed charge factor for combustion turbines by assuming a higher rate of return on equity.

[29] Lawrence B. Lindsey, identified as "Mr. Bush's chief economic advisor," ("A Triumph of Politics," *Washington Post*, June 20, 2001, p. A-14), stated the claim as follows in describing the FERC decision to impose price mitigation measures in California and the West "What they are trying to do is achieve two incompatible missions, preserving what is called 'just and reasonable pricing' and assuring an adequate supply of electricity."

[30] Watts.

[31] Vasapoli, Joe, "Cost-Based Electricity Rates: Do They Cause Over- or Under-Supply?" *Energy Daily*, July 5, 2001, makes the obvious point that the long-term commitment to buy power is the key to inducing construction under cost-based rates.

[32] Numbers in parentheses in this section are page numbers in Taylor and Van Doren.

[33] Southeastern Association of Regulatory Utility Commissioners, *The Benefits and Costs of Regional Transmission Organizations and Standard Market Design in the Southeast*, November 6, 2002.

[34] Outage Report, although not strictly a problem of "manipulation," the outage report identifies incentive and behavioral problems that can be classified in this category. The complaint about inefficient short-term transactions is essentially a complaint about the market transaction mechanism (Finding 25). The new market also elicited a reliance on nonfirm sales, which simply could not be sustained in a stressed market (Finding 24).

[35] FERC, Staff Report, pp. 3-1, 3-2.

[36] Public Utilities Commission of Ohio Report, Ohio's Electric Market: June 22-26, 1998, *What Happened and Why: A Report to the Ohio General Assembly* (Columbus, Oh; 1998) (Hereafter, Ohio Report), p. 28.

[37] Bohn, Roger E., Alvin K. Klevorick and Charles G. Stalon, Market Monitoring Committee of the California Power Exchange, *Second Report on Market Issues in the California Power Exchange Energy Markets* (March 9, 1999) (Hereafter Cal, Second Report). p. 66.

[38] FERC Staff Report, pp. 4-1, 4-16; American Public Power Association, *Electricity Prices and Volatility in Transition to Competitive Market (*Washington, D.C, May 1998). FERC, Staff Report, p. 4-9.

[39] Ohio Report, p. 25.

[40]Rosen, Richard, Freyr Sverrisson and John Stutz, *Can Electric Utility Restructuring Meet the Challenges It Has Created*, (Tellus Institute, November 2000). raise questions about the ability of any set of institutions to run the industry based primarily on external market transactions. On the problems in the electric utility industry, see, Cooper, *Industrial Organization*, which identified basic economic conditions in the electricity and telecommunications industries that raise doubts about the prospects for deregulation as the debate was beginning. .

[41] Letter from Rederick H. Ritts, Attorney for Steel Dynamics Inc., a large industrial consumer of electricity to Alan Richardson of the American Public Power Association and Roy Thilly of Wisconsin Public Power, Inc., dated August 19, 1998; FERC Staff Report, pp. 5-6, 5-7.

[42] Outage report, identifies numerous problem with information including a general lack of data (finding 6), poor load projections and forecasts (findings 8, 17, 28), unit ratings (finding 11), cable conditions and incipient failure (finding 5,14), inadequate notice (finding 20) and failure to preserve records (finding 33).

[43] Cooper, Spike, p. 21.

[44] "Motion To Intervene And Request For Rehearing Of The Consumer Federation Of America," before the Federal Energy Regulatory Commission, *San Diego Gas & Electric Company, Complaint, v. All Sellers of Energy and Ancillary Services Into Markets Operated by the California Independent System Operator and the California Power Exchange*, Docket Nos. EL00-95-000 et al,_"Reply Comments of the Consumer Federation Of America," before the Federal Energy Regulatory Commission, *San Diego Gas & Electric Company, Complaint, v. All Sellers of Energy and*

Ancillary Services Into Markets Operated by the California Independent System Operator and the California Power Exchange, Docket Nos. EL00-95-000 et al,

"[45] Initial Comments Of The Consumer Federation Of America," *Remedying Undue Discrimination through Open Access Transmission Service and Standard Electricity Market Design*, Federal Energy Regulatory Commission, Docket No.RM01-12-000.

[46] "Initial Comments of the Consumer Federation of America," Remedying Undue Discrimination through Open Access Transmission Service and Standard Electricity market Design, Federal Energy Regulatory Commission, Docket No. RM-01-12-000, October 15, 2002, West and South.

[47] FERC Staff Report, p. 3-20.

[48] The information problem received the most attention in the Outage Report. A number of information and management weaknesses are noted including inadequate forecasting tools (Finding 8, 13, 17, 18 20), a lack of monitoring instruments (Findings 5, 11, 14), and little real time information to respond to problems (Findings 6, 27).

[49] FERC Staff Report, pp. 3-2, 4-3, 4-4, 4-16.

[50] Cambridge Energy Research Associates (CERA), *Electric Power Trends: 2001* (2000); *High Tension: The Future of Power Transmission in North America* (August 2000) (hereafter, CERA, *High Tension);* Stipp, David, "The Real Threat to America's Power," *Fortune*, March 5, 2001; Harris, Kiah, E., *Thoughts on Wild Prices*, July 1998, p. 1.

[51] Id.

[52] Klemperer, Paul, *The Economic Theory of Auction* (Nuffield College, July 2000); McDiarmid, Robert C., Lisa G. Dowden, and Daniel I. Davidson, "A Modest Proposal: Revoke the Nobel Prize? Recognize the Limitations of Theory? Or Grant a License to Steal?," *Electricity Journal*, January/February 2001; Newberry, David M., "Competition, Contracts, and Entry in the Electricity Spot Market," *Rand Journal of Economics*, 29:4, 1998, citing in particular Wolfram, Catherine, D. "Strategic Bidding in a Multi-unit Auction: An Empirical Analysis of Bids to Supply Electricity in England and Wales," *Rand Journal of Economics*, 29, 1998. Newberry cites von der Fehr, N-H.M. and D. Harbrord, "Spot Market Competition in the UK electricity Industry," *Economic Journal*, 103 1993, as the origin of the auction theory approach. Brunekreeft, Gert, "A Multiple-unit, Multiple-period Auction in the British Electricity Spot Market," *Energy Economics*, 23, 2001, reviews this debate from the auction side. Kahn, Alfred, et al., *Pricing in the California Power Exchange Electricity Market: Should California Switch from Uniform Pricing to Pay-as-Bid Pricing* (California Power Exchange, January 23, 2001) Klemperer, Paul, *What Really Matters in Auction Design* (Nuffield College, February 2001. Bolle, Friedel, "Supply Function Equilibria and the Danger of Tacit Collusion: The Case of Spot Markets for Electricity," *Energy Economics,* April 1992; see also "Necessary Conditions for Efficient Multiple-bid Auctions, in R. Nau, E. Gronn, M. Machina and O. Bergland, *Economic and Environmental Risk and Uncertainty: New Models and Methods* (Kluwer, 1997).

[53] A classic example is utility resistance to conservation investments and distributed generation as systems become physically constrained (see for example, Alderfer, R. Brent, M. Monika Eldridge, and Thomas J. Starrs, *Making Connections: Case Studies of Interconnection Barriers and their Impact on Distributed Power Projects* (National Renewable Energy Laboratory, May 2000), Kahn, Michael and Loretta Lynch, *California's Electricity Options and Challenges: Report to Governor Gray Davis,* (hereafter, *Options*); Marcus, William and Jan Hamrin, *How We Got into the California Energy Crisis*, JBS Energy (2000).

[54] Staff Report, *Market Clearing Prices Under Alternative Resource Scenarios: 2000 –2010* (California Energy Commission, February 2000). U.S. Department of Energy, Office of Economic, Electricity an Natural Gas Analysis, *The Impact of Wholesale Electricity Price Controls on California Summer Reliability* (June 2001); Watts, Price C., "Heresy? The Case Against Deregulation of Electricity Generation," *The Electricity Journal*, 2001 (March 3).

[55] Rudkevich, Alesandr, Max Duckworth, and Richard Rosen, "Modelling Electricity Pricing in a Deregulated Generation Industry: The Potential for Oligopoly Pricing in a Poolco," *The Energy Journal*, 1998 (19). The Cal-ISO has argued for a dependable reserve of 14 to 19 percent, which translates into a nameplate reserve in the range of 20 to 25 percent. Borenstein, Severin and James Bushnell, "An Empirical Analysis of the Potential for Market Power in California's Electricity Industry," *Journal of Industrial Economics*, 47:3, September 1999; Bushnell, James, Christopher Knittel and Frank Wolak, *Estimating the Opportunities for Market Power in Deregulated Wisconsin Electricity Market* (Consumers First, ND). Sweetser, Al, *An Empirical Analysis of a Cominnat Dominant? Firm's Market Power in a Restructured Electricity Market: A Case Study of Colorado* (April 1, 1998);

[56] Brendan, Kirby and Eric Hirst, "Maintaining Transmission Adequacy in the Future," *Electricity Journal* (1999), acknowledge the primary importance of noneconomic factors.

[57] Moore, Steven, and Simon, Julian. (1999). *The Greatest Century That Ever Was: 25 Miraculous Trends of the Past 100 Years*. Washington DC: Cato Institute.